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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,925	10/15/2001	Steven G. Goebel	GB-300745	2085

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EXAMINER

KERNS, KEVIN P

ART UNIT PAPER NUMBER

1725

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/976,925

**Applicant(s)**

GOEBEL ET AL.

**Examiner**

Kevin P. Kerns

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☒ Claim(s) 1,2,6,8-11,20,22 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/15/01</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: "30" and "32" (in both Figures 1 and 2). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to because "FIG. 2" should be changed to "FIG. 1" on the 1<sup>st</sup> drawing sheet. Currently, both figures are labelled as "FIG. 2". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The abstract of the disclosure is objected to because it is believed that the term "suppression" (or an equivalent term) should be added after "auto-ignition" for further clarity (also see 35 USC 112, 2<sup>nd</sup> paragraph section). Correction is required. See MPEP § 608.01(b).

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4. The disclosure is objected to because of the following informalities: throughout the specification, it is believed that the term "suppression" (or an equivalent term) should be added after "auto-ignition" for further clarity (also see 35 USC 112, 2<sup>nd</sup> paragraph section). Appropriate correction is required.

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested (also see 35 USC 112, 2<sup>nd</sup> paragraph section):

REACTOR SYSTEM INCLUDING AUTO IGNITION SUPPRESSION AND CARBON SUPPRESSION FOAM.

### ***Claim Objections***

6. Claims 1, 2, 6, 8-11, 20, 22, and 28 are objected to because of the following informalities: Throughout claims 1, 2, 6, 8-11, 20, and 28, it is believed that the term "suppression" (or an equivalent term) should be added after "auto-ignition" for further clarity (also see 35 USC 112, 2<sup>nd</sup> paragraph section). In claim 22, 2<sup>nd</sup> line, "injector" should be added before "orifice" to establish proper antecedent basis. In claim 28, 7<sup>th</sup> line, "the" should be added before "front". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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8. Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claims 1, 2, 6, 8-11, 20, and 28, it is unclear what is meant by "auto-ignition and carbon-suppression foam", since this phrase is written in such a way as to have two opposite meanings: 1) auto-ignition is "enhanced" or "improved" (e.g. "auto-ignition foam") while carbon is suppressed, or 2) both auto-ignition and carbon are suppressed. It is believed that the latter meaning is intended by the applicants, and this phrase should be rewritten appropriately (also see above paragraphs) for improved clarity.

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Etievant et al. (US 6,245,309) in view of Pettit (US 6,232,005).

Etievant et al. disclose a reactor device for producing hydrogen, in which the reactor includes the following structures: a reactor housing with inlets in one end of the housing and discharge openings at an opposite end; an air charge line 30 and a steam charge line 26, both of which are separately connected to the housing; a fuel injector (having an injector body and orifice) positioned in the housing and extending out of the housing on its inlet end in the form of a fuel charge line 22; and a catalyst bed having two catalyst portions (e.g. plurality of substrates comprising nickel- and platinum-coated granules/pellets, and for which an appropriate catalyst agent would be selected by one of ordinary skill in the art) within respective annular spaces (82,84) carried in the housing and positioned downstream from the fuel injector (abstract; column 1, lines 15-19; column 3, lines 47-67; column 4, lines 1-41; column 6, lines 33-58; column 8, lines

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24-67; column 9, lines 49-65; column 10, lines 1-25; and Figures 1-5). Etievant et al. do not disclose the use of a suppression foam positioned between the catalyst bed and fuel injector.

However, Pettit discloses a fuel cell system combustor, in which the system includes the following structures: a catalyst bed 70 having a leading face 72; a mixing media bed 80 and flame arrestor 88 (also serving as a carbon suppression agent); an adjacent porous bed of metal or ceramic foam (light-off catalyst 74) supporting a catalyst agent and having an array of pores ranging from 10 to 80 pores per inch, with the ceramic foam embodiment comprising zirconia, alumina etc.; and a means to distribute a reaction mixture (atomized fuel) evenly across the leading face 72 of the catalyst bed 70, such that the use of foam adjacent the catalyst bed is advantageous for providing a tortuous path for creating turbulent flow while avoiding autoignition (abstract; column 2, lines 10-67; column 3, lines 1-2 and 24-67; column 4, line 1 through column 7, line 31; and Figures 1-3).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the reactor device for producing hydrogen, as disclosed by Etievant et al., by using the suppression foam material adjacent to the catalyst bed, as taught by Pettit, in order to provide a tortuous path for creating turbulent flow while avoiding autoignition (Pettit; abstract; column 2, lines 30-67; column 3, lines 1-2; column 4, lines 40-67; column 5, lines 1-12 and 28-47; and column 6, lines 25-26).

**Conclusion**

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Ito, Murayama et al., Muraki et al., Lane et al., Adamczyk et al., Barlow et al., Goebel, and Grieve references are also cited as related art.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns* 5/18/04  
Examiner  
Art Unit 1725

KPK  
kpk  
May 18, 2004